A

PROBATIONARY

SURGICAL ESSAY,

ON

CRURAL HERNIA;

SUBMITTED,

BY AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,

TO THE EXAMINATION OF THE

ROYAL COLLEGE OF SURGEONS OF EDINBURGH,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR CORPORATION,

IN CONFORMITY

TO THEIR REGULATIONS RESPECTING THE ADMISSION

OF

ORDINARY MEMBERS.

BY

WILLIAM WOOD,

MEMBER OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH,
AND OF THE PHYSICAL SOCIETY OF LONDON.

Non recito cuiquam, nisi amicis, idque coactus. HORACE.

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TO

ANDREW WOOD,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS

OF EDINBURGH,

THIS ESSAY

IS DUTIFULLY INSCRIBED

BY

HIS AFFECTIONATE SON,

THE AUTHOR.

ON

CRURAL HERNIA.

PROTRUSIONS of any of the viſcera from their proper cavity, have been denominated *Herniæ;* but the term has been more particularly applied to tumors formed by the diſplacement of ſome of the viſcera of the abdomen from that cavity.

Few diſeaſes, to which the human body is ſubject, have a better claim to the attention of the Surgeon, than the various ſpecies of abdominal Hernia; not only from the frequency of their occurrence, but alſo from the dangerous nature of the diſeaſe itſelf, and of the operation which is, in many caſes, neceſſary for its removal.

The different ſpecies of Herniæ have received different appellations, from the parts through which the viſcera protrude, from the place at which the tumor they form is ſituated, or from the viſcera which it contains. In this Eſſay, I ſhall confine myſelf entirely to the conſideration of that ſpecies, in which ſome of the viſcera of the abdomen paſs out of that cavity, under Poupart's ligament, and form a tumor at the upper part of the thigh, denominated *Femoral* or *Crural Hernia*. This is a diſeaſe much more frequent in the female than in the male ſex, and more ſo in married than in unmarried women *.

Before proceeding to give a hiſtory of this diſeaſe, it will be neceſſary to premiſe a ſlight anatomical account of the relative ſituation and connection of the different parts, at the top of the thigh, and lower and fore part of the abdomen; as this will explain, not only the ſituation of the tumor, but alſo the cauſe of the danger which attends both the diſeaſe and the operation which is employed for its removal.

ANA-

* Arnaud's Diſſertation on Hernias, p. 133.

Anatomy of the Lower and Fore Part of the Abdomen, and Upper Part of the Thigh.

The cavity of the abdomen is almoſt completely ſhut up, at its lower and fore part, by the tendon or aponeurotic expanſion of the external oblique muſcle, with the various faſciæ which are attached to it. This muſcle ariſes by diſtinct fleſhy heads from the eight inferior ribs; its fibres run obliquely downwards and inwards, to terminate in a broad expanded tendon, which covers the anterior part of the abdomen, in the middle of which it is united to its fellow of the oppoſite ſide, forming, by this union, a white line, extending from the enſiform cartilage to the pubes, termed the Linea Alba. Another portion of this tendon is inſerted into the os pubis and ſpine of the os ilium. A little above, and to the outer ſide of the ſymphyſis pubis, the fibres of the tendon of the external oblique muſcle ſeparate into two pillars, to form an opening for the paſſage of the ſpermatic veſſels in the male, and of the round ligament of the uterus, in the female ſex. This opening is denominated the External Abdominal Ring; it is ſtrengthened at its upper part by a number of tendinous fibres,

which, running upwards and inwards, croſs the parallel fibres of the tendon of the external oblique muſcle, and cloſely connect the two pillars to each other. The ſuperior pillar is inſerted into the ſymphyſis pubis. That portion of the tendon which forms the inferior pillar of the ring, is thicker and ſtronger than the reſt; it is termed Poupart's Ligament, or the Crural Arch. This arch, as it has been termed, extends from the anterior, ſuperior, ſpinous proceſs of the ilium, to the tuberoſity of the pubis, and was formerly deſcribed as inſerted into the bones of the pelvis, at theſe two points only; but Gimbernat has ſhown, that in all this track the tendon forms a duplicature inwards, the inner extremity of which is inſerted along the ſuperior ramus of the os pubis, for the ſpace of from half an inch to an inch, varying in different ſubjects *. It is the inner edge of this duplicature, which is in by far the greater number of caſes the cauſe of ſtrangulation in Femoral Hernia; it has been denominated Gimbernat's Ligament †.

To

* See a New Method of Operating for the Femoral Hernia, tranſlated from the Spaniſh of Don Antonio de Gimbernat.

† Thomſon's Lectures on Surgery.

To the crural arch ſeveral faſciæ are attached. One of theſe is ſituated immediately under the ſkin and cellular membrane of the fore and under part of the abdomen; it is a thin faſcia, which covers the external ſurface of the external oblique muſcle, and from thence paſſes down over the fore part of the thigh, to be attached to the faſcia lata: at the bend of the thigh it becomes conſiderably thickened, and further down it contains a number of lymphatic glands, imbedded in fat, between its laminæ. It is attached to the crural arch in its whole courſe from the anterior, ſuperior, ſpinous proceſs of the ilium to the ſymphyſis pubis. From its ſituation, this may be denominated the *External* and *Looſer Faſcia.*

Under it is ſituated the *faſcia lata* of the thigh, which is a ſtrong firm faſcia, intimately connected with the outer or cord-like edge of the crural arch, from the ilium to the ſymphyſis pubis, into which latter bone a portion of it is alſo inſerted. From the crural arch it paſſes downwards, to give a firm covering to the muſcles of the thigh.

Under the faſcia lata, there is another faſcia, which forms the anterior part of the ſheath, which

 contains

contains the great femoral veſſels; it is attached to the internal edge of the middle of the crural arch, from whence it runs downwards over the femoral artery and vein. This faſcia is, in moſt ſubjects, quite diſtinct from the faſcia lata of the thigh, there being a layer of fat between them. Between the faſcia lata and the faſcia forming the ſheath of the veſſels, there is alſo this diſtinction, that the former ariſes from the *outer*, and the latter from the *inner* edge of the crural arch *. In ſome ſubjects, however, they are ſo intimately connected, that it is hardly poſſible to ſeparate them. The looſe faſcia, the faſcia lata, and the faſcia of the femoral veſſels, though in general quite diſtinct from each other at the *middle* of the crural arch, towards its attachment to the os pubis become ſo intimately united as to form an almoſt undiſtinguiſhable maſs.

Beſides theſe three, there are two other faſciæ which require to be known. One of theſe ariſes from the internal edge of the crural arch, in its courſe from the os ilium to that part at which the femoral veſſels paſs out of the pelvis; it runs upwards over the anterior ſurface of the internal iliac muſcle,

* Thomſon's Lectures on Surgery.

muſcle, and is inſerted into the creſt of the ilium. It ſends alſo a portion downwards, behind the femoral veſſels, to form the poſterior part of the ſheath, in which they are contained. It may be denominated the *Internal Iliac Faſcia*. This Faſcia was firſt deſcribed by Gimbernat.

The remaining Faſcia, which is of a thinner texture than the former, ariſes from the internal edge of the crural arch, and extends upwards over the poſterior ſurface of the tranſverſalis muſcle. There is a hole in this faſcia, for the tranſmiſſion of the ſpermatic veſſels in the male, and of the round ligament of the uterus in the female, termed the *Internal* Abdominal Ring; it is ſituated about an inch and a half above the *external* abdominal ring, in a line drawn from the ſymphyſis pubis to the ſuperior ſpinous proceſs of the ilium. This faſcia may, from its ſituation, be denominated the Internal Abdominal Faſcia: its exiſtence and effect in producing ſtrangulation in ſome caſes of *Inguinal Hernia*, have been firſt pointed out by Mr Cooper of London, in his accurate and ſplendid work on the different ſpecies of Herniæ *.

* See page 5. Plates 1. and 2.

Under the middle of the crural arch, the external iliac artery and vein paſs out of the pelvis to the thigh, where they take the name of Femoral. In paſſing under the arch, they enter into a ſheath, the *fore part* of which is formed by the faſcia, formerly deſcribed as ariſing from the inner edge of the crural arch; the *back part*, by a portion of the internal iliac faſcia. The vein lies on the inner ſide of the artery, and of courſe nearer to the ſymphyſis pubis. The ſaphena major vein enters into the ſheath of the femoral veſſels, about an inch below the crural arch, to open into the femoval vein. The anterior crural nerve runs down the thigh, on the outſide of the ſheath of the femoral veſſels.

The epigaſtric artery is given off from the anterior part of the external iliac, a little before this artery enters the femoral ſheath, and paſſing behind the ſpermatic veſſels, or round ligament of the uterus, runs obliquely upwards and a little inwards, to the rectus abdominis muſcle.

Immediately on the inner ſide of the femoral vein, there is a ſmall round aperture in the parietes of the abdomen, formed by the diſcontinuation of the

the internal iliac faſcia at that place, termed the *Crural Ring*. This aperture was firſt accurately deſcribed by Gimbernat, though it appears to have been known long before his time *, and was called by ſome of the French anatomiſts *Le Gouſſet Graiſſeux* †. It ſeems formed for the paſſage of a number of lymphatic veſſels from the thigh to the pelvis, and is in many ſubjects filled up by a lymphatic gland.

The ſpermatic veſſels in the male, and the round ligament of the uterus in the female, paſs out of the abdomen at the *internal* abdominal ring, ſituated mid-way between the anterior ſuperior ſpinous proceſs of the ilium and the ſymphyſis pubis; they run obliquely inwards and downwards, for the ſpace of an inch and a half, in a canal formed in the duplicature of the tendon of the external oblique muſcle, termed the Inguinal Canal ‡; and then paſs through the *external* abdominal ring. In their courſe, they croſs the epigaſtric artery a little above and to the outer ſide of the crural ring.

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* Baſſuel Mercure de France, 1734.

† Memoires de Chirurgie par George Arnaud, tom. ii. p. 769.

‡ Thomſon's Lectures on Surgery.

Situation and Contents of the Tumor in Crural Hernia.

It appears, from the preceding deſcription of the ſtructure of the lower and fore part of the abdomen, that the only place at which any of the viſcera can paſs out of that cavity, under the crural arch, is at the crural ring.—Between the femoral veſſels and the ilium, the union of the internal iliac faſcia with the internal edge of the crural arch is ſo ſtrong, that, in ordinary caſes, without laceration, no protruſion can occur.

The crural ring is ſo ſituated, that when any of the viſcera eſcape from the cavity of the abdomen at it, they neceſſarily paſs into the ſheath of the femoral veſſels. If the protruded portion is ſmall, it remains within the ſheath; but if it is large, it forces its way through the faſcia forming the ſheath and the faſciæ which cover it.

The tumor formed by the protruſion is ſituated at the bend of the thigh; it is in general ſmall, round, and extremely moveable, ſeldom exceeding the ſize of a hen's egg; in ſome caſes the portion of

of protruded inteſtine is ſo ſmall, as hardly to give the leaſt appearance of tumor externally, ſo that the patient is, in many caſes, ignorant of the exiſtence of his rupture. In a few caſes, however, the tumor has been of a conſiderable ſize. Mr Thomſon mentions a caſe of a woman labouring under an old irreducible Crural Hernia, in whom the tumor extended half way down the thigh. In this caſe, the parietes of the abdomen had become ſo thin, that the periſtaltic motion of the inteſtine could be diſtinctly perceived *.

The viſcera which moſt frequently form Crural Hernia, are a part of the inteſtinal canal, of the omentum, or of both. In a few caſes, part of the urinary bladder has been protruded. The omentum is more frequently met with in hernia of the left than of the right ſide, and of old people oftener than of young †.

When the tumor contains only omentum, it is to the feel ſoft, irregular, and incompreſſible, little painful

* Lectures on Surgery.

† Memoires de Chirurgie par Arnaud, tom. ii. p. 447. Traité des Hernies de M. Richter, traduit par J. C. Rougemont, p. 200.

painful when preſſed. It is more difficult to return a portion of omentum into the abdomen, than of inteſtine. When the tumor contains inteſtine only, it is ſoft, ſmooth, and elaſtic, enlarged in ſize by the patient coughing; it is more painful on preſſure than in omental hernia, its contents are more eaſily reduced, and the reduction is in general attended with a gurgling noiſe. When the protruded inteſtine, however, contains feculent matter, the tumor is to the touch ſo much like an omental hernia, that by it alone we cannot determine what the contents are. In thoſe caſes in which both omentum and inteſtine are protruded, the omentum generally lies before the inteſtine, and ſometimes completely ſurrounds it. When the urinary bladder forms the hernia, the tumor varies much in ſize at different times, being very ſmall after the patient has voided urine; in this caſe, when the tumor is preſſed, the patient feels an inclination to make water.

All the viſcera which form Crural Hernia, except the bladder, in paſſing out of the abdomen, carry along with them a portion of peritonæum, which forms a bag or ſac, termed the *Hernial Sac*: this, when recently protruded, is thin and elaſtic, and

and has no adhesion to the surrounding parts; in some cases it may be returned into the abdomen along with its contents *. But when it has remained long out of the abdomen, it is in general much thickened, and forms such an adhesion to the surrounding parts, as to prevent its being ever returned into the abdomen. That part of the hernial sac nearest to the abdomen is generally much contracted by the pressure of the crural ring, and is usually denominated the neck of the sac.

When the hernia is small, the hernial sac, with its contents, is found, on dissection, within the sheath of the femoral vessels. It is then covered anteriorly by the integuments, the external loose fascia, the fascia lata, and the fascia forming the sheath of the vessels. But when the hernia is of a large size, the lower part of the sac is generally covered by the integuments only, this part of it having forced its way through the fasciæ at a little distance below Poupart's ligament.

Immediately on the inner side of the sac is the insertion of that duplicature of the crural arch into the

* Le Dran's Observations on Surgery, La Faye, Arnaud, Default, &c.

the ramus of the pubis, which has been denominated Gimbernat's Ligament; on its outer ſide are the femoral vein and artery; though in caſes in which the hernial ſac acquires a certain ſize, it lies in part over theſe veſſels. The epigaſtric artery runs on its anterior and outer part, and the ſpermatic veſſels in the male, or the round ligament of the uterus in the female, on its anterior and inner part. In ſome caſes the ſac, after it has paſſed out of the cavity of the abdomen, is reflected upwards over Poupart's ligament, ſo as to occupy the ſituation of the external abdominal ring.

Such is the ſituation of the ſac in Femoral Hernia, with reſpect to the neighbouring blood-veſſels, when they have the common diſtribution; but this diſtribution is liable to ſome variety. In a conſiderable proportion of caſes, the obturator artery, inſtead of ariſing, as it uſually does, from the internal iliac, comes off from the external iliac, a little before it leaves the pelvis, in a trunk common to it and the epigaſtric *.

In

* Of thirteen preparations in the poſſeſſion of Mr Thomſon, ſix have this origin of the obturator artery.

In Femoral Hernia, where there is this diſtribution of veſſels, the obturator has been found to take two different courſes. In ſome caſes it runs round the neck of the hernial ſac, from its outer to its inner ſide, to paſs down to the foramen Thyroideum. Rougemont, who has tranſlated Richter's Treatiſe on Hernia into French, and has added many very valuable notes to it, was acquainted with the origin of the obturator artery from the external iliac ; and though he does not ſeem to have met with any caſe, in which it ran round the neck of the hernial ſac, pointed out the poſſibility of its doing ſo. His words are, " Il " n'eſt pas très rare de voir l'artère obturatrice " naître avec l'épigaſtrique, par un tronc commun " de l'artère iliaque. J'ai vû cette artère obtura- " trice dans un cas ſemblable ſe porter derrière " la partie interne du ligament de Poupart, et ſe " recourber enſuite pour gagner la partie ſupéri- " eure du trou ovalaire, de manière qu'il peut " aiſément arriver que les parties en s'échappant " par l'angle interne du ligament de Poupart " (comme c'eſt le cas le plus ordinaire) paſſent " derrière cette artère, de ſorte que le principe du " ſac ſoit environné en devant, en dedans par un " demi-cercle artériel formé par l'obturatrice, en

" dehors

" dehors il y a toujours l'artère épigaſtrique ; " ainſi la dilatation dans cette circonſtance dans " quelque direction qu'on la faſſe en dehors, en " dedans, en devant eſt toujours unie au danger de " bleſſer une artère aſſez conſiderable ; et comme " on ne peut reconnoître cette diſpoſition de l'ar- " tère obturatrice, et comme elle n'eſt point in- " finement rare, je crois qu'on peut encore con- " ſidérer cette varieté comme une raiſon, qui doit " nous engager à tenter la dilatation *." This courſe of the obturator artery, which Rougemont pointed out the probability of its taking, was afterwards demonſtrated, in a ſubject who had laboured under Crural Hernia, by Dr Barclay †.

The obturator artery, in other caſes in which it ariſes from the external iliac, inſtead of running round the hernial ſac, paſſes down to the foramen Thyroideum on the outſide of the ſac, leaving the ſac

* Traité des Hernies, p. 131.

† The preparation is in the muſeum of Dr Barclay. The only other of the ſame kind which I have heard of, is one which my friend Mr James Wardrop met with in Paris. In diſſecting a ſubject, he found a ſmall Crural Hernia on each ſide ; in both, the obturator artery ran round the neck of the ſac.

ſac between it and the ſymphyſis pubis. "The "obturator artery, when it ariſes in common with "the epigaſtric, does not neceſſarily ſurround the "neck of the hernial ſac; *for, when the common "trunk of theſe two arteries is ſhort*, we have "found the obturator paſſing down into the pel-"vis, on the outſide of the hernial ſac *."

Causes of Crural Hernia.

The principal cauſes of Crural Hernia are, like thoſe of the other ſpecies of hernia, weakneſs of the parietes of the abdomen, and all thoſe circumſtances which tend to diminiſh the cavity of the abdomen, or to increaſe the preſſure of the viſcera againſt the containing parts.

Relaxation of the crural ring may be produced by a rapid abſorption of fat having taken place from diſeaſe; it ſeems alſo to be induced by childbearing, ſince we find that Crural Hernia is more fre-

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* Edinburgh Review, page 266. vol. i.—See alſo a very accurate plate of Crural Hernia, with the obturator artery following this courſe, in Dr Monro jun.'s Obſervations on Crural Hernia.

quent in married than in unmarried women. To the ſecond ſet of cauſes we may refer all thoſe muſcular exertions which diminiſh the cavity of the abdomen ; thus, in lifting a weight, in dancing, leaping, vomiting, &c. the abdominal muſcles being thrown into ſtrong action, compreſs the viſcera, part of which are thus apt to be forced through the crural ring. The chief cauſes which increaſe the preſſure of the viſcera againſt the containing parts, are diſtention of the inteſtines by air or aliment, and preternatural enlargement of any of the viſcera.

Diagnosis.

In the greater number of caſes, Crural Hernia is ſo ſtrongly marked by the general ſymptoms, that it cannot eaſily be confounded with other diſeaſes. The diagnoſis, however, is not eaſy in all caſes. The tumor in Femoral Hernia is ſo exactly in the ſeat of Bubo, that it is ſometimes difficult to diſtinguiſh the one diſeaſe from the other. In *Bubo* the tumor is hard, incompreſſible, and little moveable ; its ſize is not altered by the patient coughing ; it enlarges gradually, and is not attended with any

affection

affection of the bowels: while in *Hernia* it is ſoft and elaſtic; it generally appears ſuddenly; it is increaſed in ſize by the patient coughing; and, even when ſymptoms of ſtrangulation have not come on, there is a degree of pain and uneaſineſs in the bowels. We ſhall, in general, be better able to judge of the nature of the diſeaſe, by attending to its hiſtory, than by the feel alone. There is a caſe recorded by Mr Elſe, in which there was found, on diſſection, a portion of inteſtine ſtrangulated behind an enlarged lymphatic gland. In this caſe, the ſwelling of the gland and the protruſion of the ſac formed only one tumor *.

Pſoas abſceſs is alſo liable to be confounded with Crural Hernia, when the matter has made its way under Poupart's ligament, as it then forms a tumor in the ſame ſituation with Crural Hernia, which is increaſed in ſize by the patient coughing, and is leſſened by preſſure, part of the puriform matter being puſhed into the pelvis. This diſeaſe is diſtinguiſhed from hernia, by the tumor being leſs circumſcribed, and giving the feeling of fluctuation: the patient alſo in Pſoas abſceſs ex-

 periences,

* Medical Obſervations and Inquiries, vol. iv.

periences, for ſome time previous to the appearance of the tumor, ſevere pain in the loins.

There is, in ſome caſes, conſiderable difficulty in diſtinguiſhing Crural Hernia from Bubonocele, particularly when the hernial ſac is in the former reflected upwards over Poupart's ligament. The tumor is generally ſmaller in Crural Hernia, more rounded, more moveable, and projects more. When the hernia is recent, the ſac may, in Crural Hernia, be removed from the ſituation of the abdominal ring. There are ſome caſes on record, in which both Bubonocele and Crural Hernia exiſted on the ſame ſide: in ſome of theſe caſes they formed two diſtinct tumors, while in others there was externally the appearance of only one tumor. In the laſt of theſe, the real nature of the diſeaſe is not known till the integuments are removed *.

When, in a caſe of hernia, the tumor by preſſure can be made to diſappear, the protruded viſcera being returned into the abdomen, the hernia is ſaid to be in a *reducible* ſtate.

When

* Ludwig Adverſaria Medico-Practica, vol. i. p. 348. Arnaud, Memoires de Chirurgie, tom. ii. p. 607.

When the viſcera cannot be returned, if there are no bad ſymptoms induced by their remaining out of the abdomen, the hernia is ſaid to be in an *irreducible* ſtate.

But when ſuch a degree of compreſſion is made on the protruded viſcera as to obſtruct the paſſage of the fæces, or to impede the circulation of the blood, the hernia is in a ſtate of *ſtrangulation*. Strangulation is particularly liable to take place in Crural Hernia, from the ſmall ſize of the crural ring, and the unyielding nature of the parts by which it is formed. Strangulation alſo takes place more frequently in thoſe caſes in which the hernia has been ſuddenly formed, than in thoſe in which it is the conſequence of gradual relaxation.

Symptoms of Strangulation.

The firſt ſymptom of a portion of inteſtine being ſtrangulated, is pain in the tumor ſhooting from it all over the abdomen, but particularly ſevere about the umbilicus. This is ſoon followed by nauſea and vomiting, firſt of the alimentary matter contained in the ſtomach, and then of bile. The

bowels are in general obſtinately conſtipated; if there is any diſcharge of fæces by the anus, it is merely from the inferior part of the great inteſtines. The patient is extremely reſtleſs and uneaſy; in ſome caſes he complains, even in the early ſtages of ſtrangulation, of coldneſs, particularly of the lower extremities. The pulſe is full, and rather hard. If the ſtricture is not removed, the ſymptoms increaſe in ſeverity; the vomiting becomes more frequent and ſevere, and feculent matter is in ſome caſes diſcharged by the mouth. The patient is diſtreſſed with hiccup, the tumor ſwells, and becomes tender to the touch, the belly ſoon grows tenſe, and painful when preſſed. The pulſe becomes frequent, ſmall, and thready. Theſe ſymptoms mark inflammation, both of the protruded viſcera, and of the viſcera within the cavity of the abdomen. The inflammation ſoon runs on to gangrene. When gangrene has taken place, the vomiting in general ceaſes, or at leaſt becomes leſs frequent; the pulſe is ſtill quick, but feeble and irregular, and cold ſweats break out all over the patient's body. The tumor, now free from pain, becomes flabby, and of a dark livid colour, crackling under the finger. The abdomen continues tenſe and painful on preſſure.

There

There is often at this time a free diſcharge of fæces, and the patient feels ſo much relieved, that he thinks himſelf out of danger ; but theſe hopes are of ſhort duration, for his ſtrength gradually ſinks, and death ſoon terminates the ſcene.

Theſe are the ſymptoms which are produced by the compreſſion of ſuch a portion of inteſtine as is ſufficient to interrupt the paſſage of the fæces. But in ſome caſes, only a ſmall portion of the circumference of the inteſtine is protruded. Theſe are attended with the greateſt dangĕr, for a diſcharge of fæces frequently occurs during the whole courſe of the diſeaſe * : and, from this circumſtance, patients have died of ſtrangulated hernia, without the nature of their diſeaſe being ſuſpected. But, even in hernia where only a portion of inteſtine is pinched, there is ſometimes obſtinate conſtipation †.

The ſymptoms of ſtrangulated omental hernia are very ſimilar to thoſe of inteſtinal, but are not in general ſo ſevere, and do not advance ſo rapid-

 ly.

* Morgagni de Sedibus et Cauſis Morborum, tom. ii. pag. 48. Garengeot. Littre.

† Louis, Academie de Chirurgie, t. viii. p. 36.

ly. In ſome caſes of ſtrangulation of the omentum the bowels remain open, while in others the irritation communicated to the inteſtine is ſo great as to induce conſtipation *. The omentum, when ſtrangulated, generally becomes gangrenous, but in ſome caſes it ſuppurates †.

Seat of the Stricture.

The ſymptoms of ſtrangulation are all induced by compreſſion of the protruded viſcera. In by far the greater number of caſes of Crural Hernia, this compreſſion is made by Gimbernat's ligament. But in ſome caſes it would ſeem to have been produced by the faſcia lata of the thigh, at the diſtance of from one to two inches, or more, below Poupart's ligament. This faſcia is ſaid by Arnaud to be frequently the ſeat of ſtricture. His words are, "Tout chirurgien doit ſçavoir, qu'il "arrive aſſez ordinairement que certains paquets "des fibres du faſcia lata, plus ou moins multi- "pliées, ſont capables de faire etranglement dans "la Hernie Crurale, et même dans l'Inguinale. "J'ai-

* Arnaud, Mem. de Chirurg. t. ii. p. 540.

† Richter, p. 212.

" J'ai ſur ce fait des obſervations ſingulières à pro-
" duire. Il eſt quelquefois arrivé auſſi, qu'auſſitôt
" que ces fibres ont été coupées, les hernies ſont
" rentrées très aiſément. C'eſt a M. de Garen-
" geot à qui nous ſommes redevables de cette dé-
" couverte *. In another place he ſays, " Quel-
" ques fibres du faſcia lata s'étendent en travers
" dans certains ſujets, et vont s'attacher ſur l'os
" pubis. Voy. la Splanchnologie de Garengeot,
" p. 116. vol. 1. Ces fibres ſe multiplient dans
" quelques ſujets, et forment au deſſous de l'Ar-
" cade des bandes ligamenteuſes, capables de for-
" mer un etranglement, lorſque le ſac herniaire
" trouve la liberté de s'inſinuer par deſſous ce
" trouſſeau. J'en citerai un éxemple très re-
" marquable dans le memoire ſur les hernies avec
" mortification, où l'inteſtin qui s'étoit introduit
" ſous ces fibres, formoit une hernie avec etrangle-
" ment, à quatre travers de doigt au deſſous du
" ligament, ſans aucune apparence de tumeur
" dans l'aine †."

Gimbernat's ligament, therefore, and the fibres of the faſcia lata, are the only two ſeats of ſtricture in Crural Hernia which are external to the hernial

* Arnaud, tom. ii. p. 776. † Ib. p. 606.

hernial ſac. And the ſtricture may occur in one of theſe ſeats only, or in both at the ſame time.

In a few caſes, however, the ſtricture is formed by the neck of the hernial ſac, this having become hard and contracted by the preſſure of the crural ring.

Occaſionally the ſtricture exiſts within the hernial ſac. It is then formed, either by the omentum, or by membranous bands which run acroſs the ſac.

In large old herniæ, all the ſymptoms of ſtrangulation are ſometimes induced by accumulation of fæces within the protruded inteſtine. When this is the caſe, the tumor enlarges and becomes harder than uſual for ſome time previous to its being at all painful. This is the leaſt dangerous cauſe of ſtrangulation, as inflammation is not ſpeedily produced by it; in moſt caſes alſo it is eaſily removed.

Treatment.

In reducible Crural Hernia, the protruded viſcera are to be returned into the cavity of the abdomen, and their future deſcent is to be carefully guarded againſt, by the application of a ſpring truſs.

In irreducible Femoral Hernia, when the tumor is ſmall, it has been propoſed to apply a truſs hollowed out like a ſaucer, to prevent further deſcent: but it is not quite obvious that any material advantage could be derived from this practice.

In the treatment of ſtrangulated Crural Hernia, our object is to remove, as ſoon as poſſible, the preſſure on the protruded parts, which is the cauſe of all the ſymptoms.

For this purpoſe, an attempt muſt be made to return the contents of the hernial ſac into the abdomen. The patient being laid on his back, with his head and pelvis a little elevated, and the thigh of the ſide on which the hernia is, bent nearly at right angles to his body, in order to relax the

faſcia

faſcia lata; "the operator ſhould ſtand cloſe by "the bed, on the ſame ſide with the hernia: with "the hand next the patient's abdomen, he ſhould "graſp the tumor at its baſe and upper part, and "compreſſing it moderately on the ſide by his "three foremoſt fingers, he ſhould, at the ſame "time, with the other hand, puſh the lower end "of the tumor upwards and inwards, to direct it "towards the crural ring *."

When the hernial ſac is reflected upwards over Poupart's ligament, it is neceſſary that the preſſure ſhould, in the firſt inſtance, be made directly downwards. When there are no ſymptoms of inflammation in the tumor, and when it gives little or no pain when handled, a degree of preſſure ought to be kept up for a conſiderable length of time. Gimbernat ſays he has ſucceeded in producing the reduction of the protruded viſcera, by continuing the preſſure for upwards of an hour †. Theſe attempts at reduction are not attended with any bad conſequence, when made previous to the appearance of inflammation; but whenever this has commenced, all ſuch attempts ought to be made in the moſt gentle manner, and muſt not be perſiſted in; otherwiſe,

* Gimbernat, p. 41. † Ibid. p. 42.

otherwiſe, by increaſing the inflammation, we ſhall haſten its progreſs towards gangrene.

When we ſucceed in the reduction in the early ſtages of ſtrangulation, the patient is ſuddenly relieved, the ſymptoms diſappear, and there is generally in a few hours a free diſcharge of fæces. But in ſome of thoſe caſes in which a degree of inflammation has taken place, the ſymptoms continue to increaſe after the reduction, and the bowels remain conſtipated; in theſe caſes, purgatives muſt be given to procure a free evacuation of the bowels, and if there is much pain in the abdomen, with a ſmall frequent pulſe, blood-letting, (unleſs there are particular circumſtances which contra-indicate its uſe), ſhould be had recourſe to; the quantity of blood to be drawn depending on the habit of body of the patient and the violence of the ſymptoms.

If the firſt attempts at reduction prove unſucceſsful, immediate recourſe ſhould be had to *Blood-letting*, which is in many caſes uſeful, by the general relaxation which it induces. The patient ſhould be bled in an upright poſture, and from a large orifice, to encourage fainting. The attempts

attempts at reduction ſhould now be repeated; and they ſometimes prove ſucceſsful after a quantity of blood has been drawn, in caſes where they had failed before. Even if the reduction ſhould not be effected by the blood-letting, it is of great uſe in allaying the inflammation, and retarding its progreſs towards gangrene. We are not to be deterred from the uſe of the lancet by coldneſs of the patient's extremities, nor by ſmallneſs of his pulſe, as this ſtate of the pulſe is induced by inflammation of the inteſtine ariſing from any other cauſe.

The *warm bath* has been much uſed in ſtrangulated hernia, from the general relaxation which it induces. It may prove uſeful, in thoſe caſes of ſcrotal or inguinal hernia, in which the ſtricture is formed by a ſpaſmodic contraction of the muſcular fibres ſituated at the internal abdominal ring; but in Crural Hernia it does not promiſe to be of the ſame advantage, as the ſtricture cannot in this ſpecies, from the ſituation of the hernial ſac, depend on muſcular contraction.

Purgative medicines have been found uſeful, in procuring the reduction of the protruded inteſtine, in

in cafes of large herniæ, in which the ſymptoms of ſtrangulation depended on an accumulation of fæces. In recent caſes, they are ſometimes uſed with advantage, in the very early ſtages of ſtrangulation, previous to the occurrence of inflammation. But whenever inflammation has commenced, purgatives are very hurtful, and add much to the diſtreſs of the patient, by increaſing the frequency and the ſeverity of the vomiting. The late Dr Monro ſays, " I have many times made a " rupture reduce, by giving powder of the jallap " root and ſweet mercury, when neither hands " nor emollients did any good *." When purgative medicines are to be employed, they are to be given along with an opiate, which renders them leſs likely to be rejected by vomiting.

Purgative injections are leſs powerful in procuring the reduction of the protruded viſcera than purgatives given by the mouth; but they may be uſed with ſafety in all ſtages of the diſeaſe.

Injections of an infuſion of *tobacco* in water have been very much recommended of late years; they induce naufea, cold ſweat, and great general relaxation,

* Medical Eſſays and Obſervations, vol. v. p. 283.

relaxation, during which the viſcera have in ſome caſes been returned into the abdomen. They ought to be employed in the early ſtages of the diſeaſe only; in its later ſtages they may prove hurtful, by delaying the operation, on the ſpeedy performance of which the patient's life in many caſes depends, as he is left, for ſome time after their adminiſtration, in a very unfit ſtate to undergo an operation.

Opium, which is ſo uſeful in procuring the reduction of the viſcera in inguinal or ſcrotal hernia depending on ſpaſm, may be employed with great advantage in Crural Hernia, to allay the vomiting and hiccup, which are ſo diſtreſſing to the patient.

Of the various local remedies which have at different times been recommended for the cure of ſtrangulated hernia, the application of *cold* ſeems at preſent to be moſt frequently employed. It is applied in the form of ice or ſnow to the tumor. Theſe ſhould be uſed in the early ſtages of the diſeaſe only, and ſhould not be applied for any conſiderable length of time, as all the good effects which can be expected from them may be had in a very

very ſhort time, and their continuance is attended with danger, as they have been found in a few hours to freeze the integuments, and thus to induce inflammation and gangrene.

Daſhing *cold water* on the patient's abdomen is another method of applying cold, which has been frequently employed, and which is ſaid to have ſometimes proved ſucceſsful. It appears to me a much ſafer practice than the application of ice or ſnow to the tumor.

Theſe are the principal remedies which have been employed to procure the reduction of ſtrangulated hernia. Unfortunately they are not often ſucceſsful in *Crural Hernia;* becauſe in this ſpecies, when ſtrangulation has taken place, the ſtricture is in the greater number of caſes ſo tight, that it can only be removed by an operation.

This operation ſhould be had recourſe to as ſoon as the other means have had a fair trial. It is ſeldom of uſe, unleſs performed early; for the inflammation of the inteſtine in general runs very quickly on to gangrene. The time from the occurrence of ſtrangulation, at which gangrene com-

 mences,

mences, is extremely uncertain, depending on the degree of ſtricture, the habit of body of the patient, and the kind of treatment which has been had recourſe to. In ſome caſes the protruded inteſtine has become gangrenous in the courſe of one day from its firſt expulſion *.

Though the operation ſhould always be had recourſe to early, no period of the diſeaſe is too late for its performance. Even when gangrene has taken place, by procuring a free diſcharge of fæces from the wound, we give the patient a chance of life, by the formation of an artificial anus.

Operation for Crural Hernia.

The patient having evacuated the contents of the bladder, and being placed in a proper poſition, an inciſion is to be made through the integuments, from a little above Poupart's ligament to the lower part of the tumor. If any blood-veſſel is divided by this inciſion, it ought to be ſecured before proceeding further.

The

* Bell's Syſtem of Surgery.

The integuments being divided, when the hernial ſac is ſmall, it is neceſſary to divide the external looſe faſcia, the faſcia lata, and the faſcia forming the ſheath of the femoral veſſels, in order to expoſe the ſac. Theſe ſhould be divided, with the help of a director, from the crural arch downwards to the bottom of the ſac. In cutting the external faſcia, care muſt be taken to avoid wounding the lymphatic glands contained between its laminæ; and in laying open the ſheath of the veſſels, we muſt take care not to divide the ſaphena major vein. In thoſe caſes in which the hernial ſac is of a larger ſize, and has forced its way through the faſciæ, the under part of the ſac is expoſed by the inciſion through the integuments; it is then neceſſary to divide the faſciæ covering its upper part. The hernial ſac being expoſed in its whole extent, an opening is to be cautiouſly made into its lower part, by pinching it up from the contained viſcera with the finger and thumb, and cutting horizontally, unleſs there is too great tenſion to allow of our doing this: if this is the caſe, an opening muſt be very cautiouſly made by repeated ſcratches of the knife. In the greater number of caſes, as ſoon as the knife has penetrated into the cavity of the ſac, a ſmall quantity of ſerum ruſhes out. Into the

opening the finger is to be introduced, and on it the diviſion of the ſac is to be continued in its whole extent *.

If the protruded viſcera are in a ſound ſtate, an attempt ſhould now be made to return them into the cavity of the abdomen, which can be done in thoſe caſes in which the ſtricture is formed by the faſciæ covering the ſac, as this is removed when they are divided as high up as Poupart's ligament. " Souvent il n'eſt pas néceſſaire de faire l'inciſion " du *ligament*, parceque le plus ordinairement les " Hernies *Crurales* ſont fort petites, ſoit qu'elles " ſoient faites d'inteſtin ou d'epiploon, et qu'elles " ſe réduiſent aſſez facilement, lorſque l'on a coupé " les *fibres* tranſverſales qui ſe détachent du *facia-* " *lata*, ou lorſque le *ſac* eſt ouvert †."

If

* It was propoſed by Petit, in operating for ſtrangulated hernia, in ſome caſes to leave the ſac unopened. But ſurgeons are now very generally of opinion, that the ſafeſt practice is in all caſes to open the ſac. See Petit, Traité des Maladies Chirurgicales, tom. ii. p. 370. Medical Eſſays and Obſervations, vol. v. p. 285. Obſervations on Crural Hernia by Dr Monro jun.

† Gunzius. See Arnaud, Memoires de Chirurgie, tom. ii. p. 775.

If the reduction cannot be accomplished after the hernial sac has been opened, the stricture, which will in general be found to be formed by the crural arch, must be removed. This part of the operation, from the situation of the hernial sac with respect to the neighbouring blood-vessels, is attended with a considerable degree of danger. While the stricture was supposed to be formed by the *outer edge* of the crural arch, denominated Poupart's ligament, it was hardly possible to remove it with a cutting instrument without injuring some blood-vessel, as an incision made into that ligament *upwards and outwards* divides the epigastric artery, while if made *directly upwards*, or *upwards* and *inwards*, it divides the spermatic vessels in the male, and the round ligament of the uterus, with its accompanying artery, in the female.

Aware of these dangers, different methods have been proposed by different authors, of cutting Poupart's ligament without dividing any of the vessels *. All these, however, are not only far from being free from the danger which they were intended to obviate, but are now found to be un-

 necessary,

* Bell's System of Surgery. Monro on the Bursæ Mucosæ.

neceſſary, as the ſtricture is not formed by Poupart's ligament.

Arnaud, with a view to avoid the danger of making an inciſion into Poupart's ligament, propoſed, by means of a blunt hook introduced under that ligament, to raiſe it up, and thus to dilate the paſſage through which the viſcera protrude. In this way, he ſays, he has been able to remove the ſtricture. But as the ſtricture is formed, not by Poupart's ligament, but by the *internal edge* of the crural arch, the blunt hook of Arnaud ought to be introduced under it. By ſtretching this, it is poſſible that a ſmall degree of dilatation of the crural ring may be produced, and that thus the viſcera may be returned into the abdomen. As this method of uſing the tenaculum of Arnaud is attended with no danger, and may in ſome caſes prove ſucceſsful, it ought to be tried, before proceeding to cut that part of the crural arch which forms the ſtricture.

The idea of dilating the parts through which the viſcera protrude in ſtrangulated hernia, ſuggeſted by Arnaud, was followed up by Le Blanc, who invented for that purpoſe an inſtrument term-

ed

ed his Dilator *. But it is evident, that in ſtrangulated Crural Hernia, it would be extremely difficult, if not impoſſible, to introduce the dilator of Le Blanc into the crural ring; and if it could be introduced, a degree of force neceſſary for the dilatation could not be made, without very great danger of injuring either the protruded inteſtine or the femoral veſſels.

Gimbernat, to whom the merit is due of having firſt pointed out, that the ſtricture in Femoral Hernia is formed, not by the ligament of Poupart, but by the inner edge of the duplicature of the crural arch, near its inſertion into the ramus of the pubis, propoſed that this part ſhould be divided in the following manner. "Introduce, along "the internal ſide of the inteſtine, a canulated or "grooved ſound, with a blunt end, and a chan- "nel of ſufficient depth. This is to be directed "obliquely inwards, till it enter the crural ring, "which will be known by the increaſed reſiſt- "ance; as alſo when its point reſts upon the "branch of the os pubis. Then ſuſpend the in- "troduction; and keeping the ſound (with your "left hand, if you are operating on the right ſide,

* Le Blanc's Operations of Surgery.

" and *v. v.*) firmly reſting upon the branch of the
" os pubis, ſo that its back ſhall be turned to-
" wards the inteſtine, and its canal to the ſym-
" phyſis pubis, introduce gently with your other
" hand into the groove of the ſound, a biſtoury
" with a narrow blade and blunt end, till it en-
" ter the ring: its entry will be known, as be-
" fore, by a little increaſe of reſiſtance. Cau-
" tiouſly preſs the biſtoury to the end of the ca-
" nal; and employing your two hands at once,
" carry both inſtruments cloſe along the branch
" to the body of the pubis, drawing them out at
" the ſame time. By this eaſy operation, you
" will divide the internal edge of the crural arch
" at its extremity, and within four or five lines of
" its duplicature, the remainder continuing firmly
" attached by the inferior band or pillar, of which
" it is the continuation. This ſimple inciſion be-
" ing thus made without the ſmalleſt danger, the
" internal border of the arch, which forms the
" ſtrangulation, will be conſiderably relaxed, and
" the parts will be reduced with the greateſt eaſe.

" By this new method, the operation for the
" Crural Hernia, which the moſt celebrated ſur-
" geons have juſtly accounted extremely danger-
" ous,

" ous, is rendered the moſt ſimple and ſafe of " all that are practiſed in caſes of ſtrangulated " hernia.

" The Fallopian ligament is not at all concerned " in this operation; neither can the ſpermatic cord " or ſpermatic artery, much leſs the epigaſtric, be " divided; for all theſe parts are left at the ſhoul- " ders of the ſound, and far remote from the edge " of the biſtoury. The ſame may be ſaid of the " obturatrix artery, when it ariſes from the great " ſecondary external iliac, though it paſſes over " the branch of the pubis in its way to the fora- " men obturator *."

This method of operating poſſeſſes many advantages over thoſe which had been propoſed previous to the publication of Gimbernat's eſſay, as by it the fibres which are the cauſe of the ſtrangulation, and theſe only, are divided, without the leaſt riſk of injuring either the ſpermatic veſſels or epigaſtric artery. In ordinary caſes of Crural Hernia, therefore, this operation would be, as Gimbernat aſſerts, *free from all danger*.

To

* Gimbernat, p. 45.

To Mr Thomſon we are indebted for having firſt pointed out a danger to which this operation is liable. He demonſtrated, that in thoſe caſes in which the obturator artery runs round the neck of the hernial ſac, the operation of Gimbernat muſt divide that artery *.

Gimbernat, though aware of the origin of the obturator artery from the external iliac, was not acquainted with the courſe which it follows when the trunk common to the epigaſtric and it is long; otherwiſe he could not have ſaid that it cannot be divided in his operation, becauſe it is left at the ſhoulders of the ſound, far remote from the edge of the biſtoury.

As the diviſion of the obturator artery would, from its ſize, prove equally fatal with that of the epigaſtric, and as it is impoſſible to aſcertain, previous to the removal of the ſtricture, what courſe it takes, the operation of Gimbernat muſt therefore be laid aſide.

Mr Hey of Leeds, in his very valuable Obſervations in Surgery, has propoſed an operation for the

* Thomſon's Surgical Lectures.

the removal of the ſtricture in Crural Hernia, ſomewhat different from that of Gimbernat.

His method of dividing the part forming the ſtricture, which he denominates the *Femoral Ligament*, but which, from his deſcription *, appears to be the internal edge of the crural arch, now denominated Gimbernat's Ligament, he deſcribes in the following words. " The ſtricture made upon " the prolapſed parts is very great, as I have al- " ready obſerved ; but if the tip of the finger can " be introduced within the femoral ring, to guide " the bubonocele knife, a ſmall inciſion (for the " ring is narrow) will be ſufficient to ſet the parts " at liberty. If the tip of the finger cannot be " introduced at the proper place, a director with " a deep groove muſt be uſed inſtead of the fin- " ger ; but I prefer the latter. The finger or " director ſhould not be introduced very near the " great veſſels, but on that ſide of the inteſtine or " omentum which is neareſt to the ſymphyſis of " the oſſa pubis. The inciſion may then be made " directly upwards †."

He

* Practical Obſervations in Surgery, by William Hey, Eſq; F. R. S. p. 151.

† Ibid. p. 155.

He adds, " It is much more eaſy to divide the " *abdominal* (Poupart's) than the *femoral* liga- " ment; but it is the diviſion of the latter only " that will ſet the prolapſed parts at liberty *."

In this operation, Mr Hey ſeems to divide the ſame part that Gimbernat recommends to be divided, but in a ſomewhat different direction. This method is equally free from the danger of wounding either the ſpermatic veſſels or epigaſtric artery with that of Gimbernat, provided care is taken that the inciſion does not extend higher than Poupart's ligament; but it is equally liable to the danger of dividing the obturator artery in thoſe caſes in which it ſurrounds the neck of the hernial ſac.

Mr Thomſon, in reflecting on the danger of wounding the obturator artery with which theſe two methods of operating is attended, was led to propoſe another, with a view to avoid that danger; but a ſimilar method, as he afterwards found, had been recommended by the late Mr Elſe and by Mr Cline, though with a different view. By them it was propoſed, merely to avoid wounding the epigaſtric artery in dividing Poupart's ligament. This operation is to be performed in the following

* P. 156.

following manner. A ſmall opening is to be made in the parallel fibres of the tendon of the external oblique muſcle, immediately above Poupart's ligament, by ſeparating theſe by very ſlight ſcratches of the knife. Into the opening, the point of a curved grooved director is to be introduced, which is to be paſſed downwards, ſo as to be brought out at the crural ring. Great care muſt be taken, in paſſing the director, to keep its point cloſely preſſed to the fibres of the crural arch, to prevent its getting behind the obturator artery when it happens to ſurround the hernial ſac. The director will then lie immediately behind the ligament of Gimbernat, which may be divided on it, without the riſk of wounding any blood-veſſel *.

The only other method of dividing the ligament of Gimbernat which has, as far as I know, been propoſed with the view of avoiding the obturator artery, is the following. The hernial ſac being laid open, a curved grooved director is to be introduced into the crural ring, and directed inwards to the ſymphyſis pubis, as recommended by Gimbernat, but on the *outſide* of the hernial ſac: care muſt be taken

* The operation has been performed ſucceſsfully in this way, in two caſes in the Royal Infirmary, by Mr Law.

taken, in introducing the director, to keep its point closely pressed to the ligament of Gimbernat; on it a few of the fibres forming that ligament are to be divided *. The division of a very few fibres will generally be sufficient to allow of the return of the prolapsed parts. This operation differs from that of Gimbernat, in the director being passed on the *outside* of the hernial sac. By this means the director lies between the ligament of Gimbernat and the obturator artery, which will therefore be completely removed from the edge of the knife. One objection to this method of operating is, that in cases in which inflammation has taken place previous to the performance of the operation, the hernial sac is apt to adhere to the crural ring; so that in such it would be impossible to pass a director between them.

Gimbernat's ligament being divided by one of these two last-mentioned operations, the stricture will, in the greater number of cases, be removed. But in those rare cases in which the stricture is formed by the neck of the sac, it will not be possible to return the protruded viscera till this is dilated.

* Cooper's Lectures on Surgery. Thomson's Lectures on Surgery.

lated. An attempt ſhould be made to dilate the neck of the ſac by means of the finger; but if this fails, recourſe muſt be had to the knife. The inciſion muſt be made in a direction towards the ſymphyſis pubis, after the ſac has been pulled out a little from the cavity of the abdomen, and after we have aſcertained by the feel the courſe of the obturator artery, which is to be cautiouſly avoided.

The protruded viſcera are now to be carefully examined, and, if found in a ſound ſtate, and free from adheſions, are to be immediately returned into the cavity of the abdomen. In returning the inteſtine, it muſt be very gently handled; and that part is to be returned firſt which has been laſt protruded. The inteſtine is generally found of a dark colour; but this ſhould not prevent its return, provided its ſtructure is entire.

In caſes in which the viſcera have remained long out of the abdomen, and in thoſe in which a conſiderable degree of inflammation has taken place previous to the performance of the operation, adheſions are frequently found of the protruded viſcera, either to each other or to the hernial ſac.

The

The adheſions, when recent, are of a ſoft gelatinous nature, being formed of effuſed coagulable lymph. But when they have exiſted for ſome time, they are organized, of a firm conſiſtence, and very ſimilar to thoſe adheſions which ſo frequently take place between the pleura coſtalis and pleura pulmonalis; in ſome caſes they are filamentous, in others membranous.

Whenever the adheſions are ſlight, the adhering parts ought to be ſeparated with the finger; but in the moſt gentle manner, leſt the inteſtine ſhould be torn. When the viſcera have formed an attachment to each other, or to the ſac by filaments, theſe filaments may be ſafely divided with the knife.

When there is a membranous adheſion between a portion of inteſtine and the hernial ſac, or the omentum, theſe ſhould be ſeparated, as we can uſe freedom in cutting away a part either of the ſac or omentum. But when two folds of inteſtine adhere cloſely and firmly, it is better to return them into the abdomen in their adhering ſtate, than run the riſk of wounding them by the ſeparation.

When

When the omentum is found in a gangrenous ſtate, all the dead part is to be removed, which is to be done with the knife. Hæmorrhage ſeldom takes place. If one or more arteries ſhould bleed, they are to be ſecured by ligatures. But a ligature ſhould never be applied to a portion of omentum, with a view to remove it by obſtructing the circulation of the blood, as it is apt to induce nauſea, vomiting, and other violent ſymptoms *.

When the inteſtines are found in a gangrenous ſtate, the patient is in a very dangerous condition; but he ought by no means to be given up by the ſurgeon, as there are many caſes on record of patients recovering even after the removal of a conſiderable portion of inteſtine by ſphacelation.

The treatment of gangrenous inteſtines varies according to the extent of the gangrene. If only a portion of the cylinder of the inteſtinal tube be removed, the inteſtine is to be returned into the abdomen; but that portion in which the gangrene

 exiſts

* Pott on Ruptures.

exiſts is to be ſecured by ſtitches paſſed through the inteſtine and mouth of the hernial ſac, near to the external wound, that the fæces may be diſcharged by it. In ſome caſes of this kind the patient has ſurvived, and an artificial anus has been formed at the wound, by which the fæces have continued to be diſcharged during life; while in others they have paſſed by the wound for ſome time, but have gradually reſumed their natural courſe, and a complete cure has been effected *.

When the whole cylinder of the inteſtine is in a gangrenous ſtate, all the dead portion is to be removed; the inteſtine is to be returned into the abdomen, but its divided edges are to be retained near each other and the external wound, by ligatures paſſed through the meſentery and mouth of the ſac. This is a practice which has in many caſes proved ſucceſsful.

Mr Cooper of London has recommended, that an attempt ſhould be made to procure reunion of the divided edges of the inteſtine. The practice which

* Medical Eſſays, Gooch's Caſes in Surgery, &c. &c.

which he has recommended he was led to adopt, from the ſucceſsful reſult of ſome very intereſting experiments made on animals by Mr Thomſon and himſelf *. " The practice, therefore, (ſays Mr " Cooper) which ought to be followed in an in- " teſtine divided by mortification, is to cut off its " mortified extremities, and then to paſs four " ſtitches through them, one at the meſentery, " and the three others at equal diſtances round " the inteſtine. Then returning it to the mouth " of the hernial ſac, which ſhould be opened " higher up than uſual, it muſt be there firmly " confined, by a ligature being paſſed through the " meſentery, in the manner already directed. If " ſtools paſs the ligatures, and the patient goes " on well, the ligatures may remain until they are " thrown off by ulceration; but if there are no " ſtools, and the patient ſuffers from a diſtended " abdomen, three of the ſtitches ſhould be cut " away, leaving that which attaches the inteſtine " to the hernial ſac, as well as that which joins " its edges at the meſentery. The fæces can then " readily eſcape at the external wound; and as " granulations ariſe and the wound heals, the

 " mouths

* See Cooper on Hernia.

" mouths of the divided inteſtine will become " united, ſo that the fæces will take their natural " courſe *."

When the operation is completed, if the viſcera have been returned into the abdomen in a found ſtate, the lips of the wound, being cleared of blood, are to be brought together, and retained by ſlips of adheſive plaſter, and a compreſs and bandage are to be applied.

In general, the patient feels great relief after the operation, and he has, in a few hours, a free diſcharge of fæces. If this ſhould not ſoon take place, mild laxatives and purging injections ſhould be adminiſtered.

When the inteſtines have been in a ſtate of inflammation at the time they were returned into the cavity of the abdomen, it is apt to continue, and has, in many caſes, proved fatal. Whenever, therefore, the patient, after the operation, complains of ſevere pain in the abdomen, which is not removed by purgative medicines, particularly if the pulſe is ſmall and hard, blood-letting, unleſs it

* Cooper, p. 36.

it is contra-indicated, ſhould be had recourſe to, and ſhould be repeated, in proportion to the ſtrength of the patient and the ſeverity of the ſymptoms.

From the irritable ſtate of the ſtomach and bowels, in ſome caſes vomiting, in others diarrhœa, comes on after the operation. Theſe are to be removed by the exhibition of opium.

Having brought this Eſſay to a concluſion, it only remains for me to acknowledge how much I am indebted to Mr Thomſon, Profeſſor of Surgery to the Royal College of Surgeons of Edinburgh, for the information which I have received on the ſubject, not only from his valuable Lectures, but alſo from his very accurate diſſections of the parts concerned in the diſeaſe, which he was ſo kind as to allow me to witneſs.

FINIS.